PCI8252

User's Manual

Beijing ART Technology Development Co., Ltd.

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Chapter 1 Overview

In the fields of Real-time Signal Processing, Digital Image Processing and others, high-speed and high-precision data acquisition modules are demanded. ART PCI8252 data acquisition module, which brings in advantages of similar products that produced in china and other countries, is convenient for use and has low cost and stably high performance.

ART PCI8252 is an Arbitrary-waveform generator board based on PCI bus. It can be directly inserted into IBM-PC/AT or a computer which is compatible with PCI8191. It can be used as signal generating source in a variety of fields such as the laboratory, product quality testing center and so on.

Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the local dealer or sales for a replacement. Retain the shipping carton and packing material for inspection by the dealer.
Check for the following items in the package. If there are any missing items, contact your local dealer or sales.

- PCI8252 Data Acquisition Board
- ART Disk
  a) user's manual (pdf)
  b) drive
  c) catalog
- Warranty Card

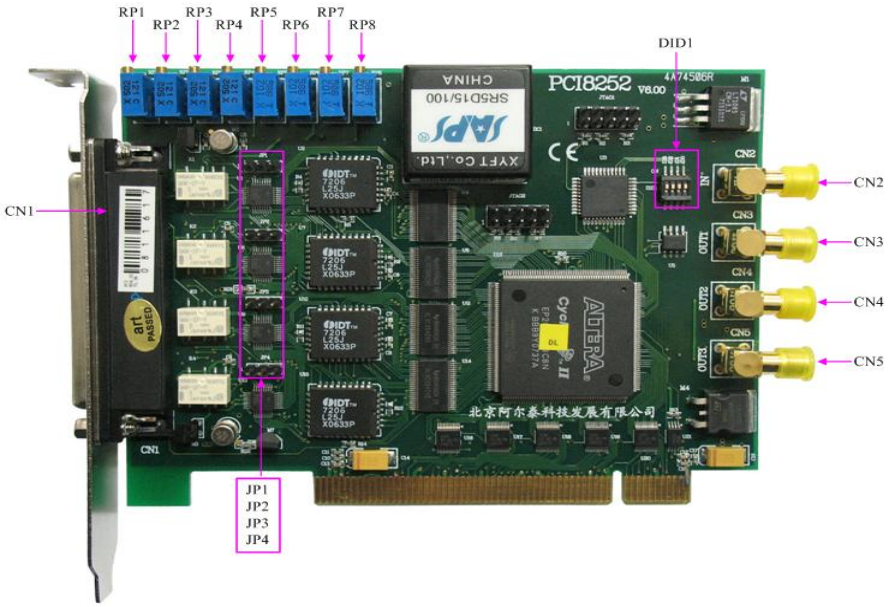
FEATURES

DA analog output

- Output Range: ±5V, ±10V, 0~10V, 0~5V
- 16-bit resolution
- Channel No.: 4-channel
- Memory Depth: 16K word FIFO memory per channel
- Trigger Mode: rising edge and falling edge
- Non-linear error: ±3LSB (max)
- Operating Temperature Range: 0℃~55℃
- Storage Temperature Range: -20℃~70℃

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



2.2 The Function Description for the Main Component

2.2.1 Signal Input and Output Connectors

CN1: analog signal output port.
CN2 (CLKIN): synchronization pulse signal, external trigger signal input.
CN3 (CLKOUT1), CN4 (CLKOUT2), and CN5 (CLKOUT3): synchronization pulse signal output.

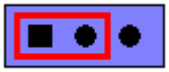
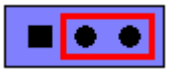
2.2.2 Potentiometer

RP5: AO0 analog signal output zero point adjustment potentiometer
RP7: AO1 analog signal output zero point adjustment potentiometer
RP6: AO2 analog signal output zero point adjustment potentiometer
RP8: AO3 analog signal output zero point adjustment potentiometer
RP1: AO0 analog signal output full-scale point adjustment potentiometer
RP2: AO1 analog signal output full-scale point adjustment potentiometer
RP3: AO2 analog signal output full-scale point adjustment potentiometer
RP4: AO3 analog signal output full-scale point adjustment potentiometer

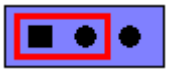
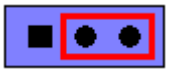
2.2.3 Jumper

JP1~JP4: AO0~AO3 output setting, connect the first and the second pin of the jumper, the output is intermediate value, and connect the second and the third pin, the output is minimum value.

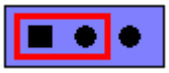
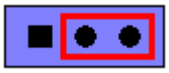
DA0 analog signal output value selection

JP1	0~5V	0~10V	±5V	±10V
	2.5V	5V	0V	0V
	0V	0V	-5V	-10V

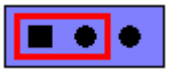
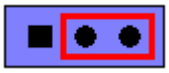
DA1 analog signal output value selection

JP2	0~5V	0~10V	±5V	±10V
	2.5V	5V	0V	0V
	0V	0V	-5V	-10V

DA2 analog signal output value selection

JP3	0~5V	0~10V	±5V	±10V
	2.5V	5V	0V	0V
	0V	0V	-5V	-10V

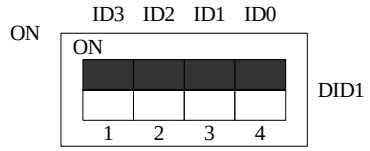
DA3 analog signal output value selection

JP4	0~5V	0~10V	±5V	±10V
	2.5V	5V	0V	0V
	0V	0V	-5V	-10V

2.2.4 Physical ID of DIP Switch

DID1: Set physical ID number. When the PC is installed more than one PCI8252 , you can use the DIP switch to set a physical ID number for each board, which makes it very convenient for users to distinguish and visit each board in the progress of the hardware configuration and software programming. The following four-place numbers are expressed by the binary system: When DIP switch points to "ON", that means "1", and when it points to the other side, that means "0." As they are shown in the following diagrams: place "ID3" is the high bit."ID0" is the low bit, and the black part in the diagram represents the location of the switch. (Test software of the company often use the logic ID management equipments and at this moment the physical ID DIP switch is invalid. If you want to use more than one kind of the

equipments in one and the same system at the same time, please use the physical ID as much as possible. As for the differences between logic ID and physical ID, please refer to the function explanations of "CreateDevice" and "CreateDeviceEx" of ***The Prototype Explanation of Device Object Management Function*** in ***PCI8252S*** software specification



The above chart shows"1111", so it means that the physical ID is 15.

The above chart shows"0111", so it means that the physical ID is 7.

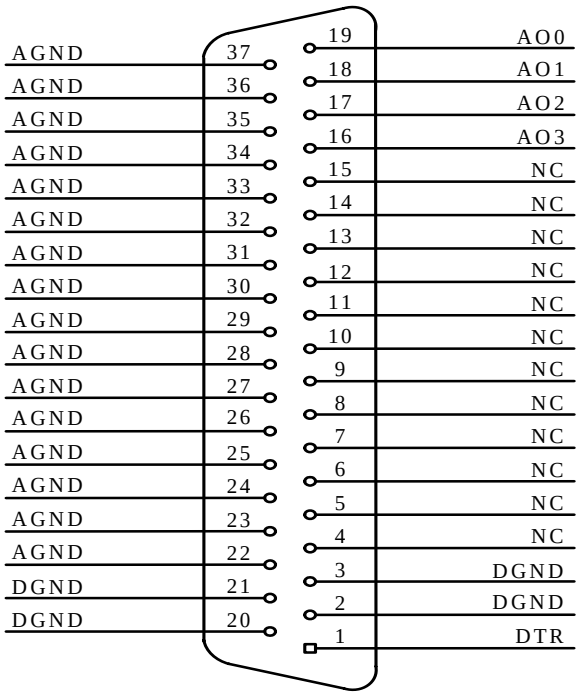
The above chart shows"0101", so it means that the physical ID is 5.

ID3	ID2	ID1	ID0	Physical ID（Hex）	Physical ID（Dec）
OFF（0）	OFF（0）	OFF（0）	OFF（0）	0	0
OFF（0）	OFF（0）	OFF（0）	ON（1）	1	1
OFF（0）	OFF（0）	ON（1）	OFF（0）	2	2
OFF（0）	OFF（0）	ON（1）	ON（1）	3	3
OFF（0）	ON（1）	OFF（0）	OFF（0）	4	4
OFF（0）	ON（1）	OFF（0）	ON（1）	5	5
OFF（0）	ON（1）	ON（1）	OFF（0）	6	6
OFF（0）	ON（1）	ON（1）	ON（1）	7	7
ON（1）	OFF（0）	OFF（0）	OFF（0）	8	8
ON（1）	OFF（0）	OFF（0）	ON（1）	9	9
ON（1）	OFF（0）	ON（1）	OFF（0）	A	10
ON（1）	OFF（0）	ON（1）	ON（1）	B	11
ON（1）	ON（1）	OFF（0）	OFF（0）	C	12
ON（1）	ON（1）	OFF（0）	ON（1）	D	13
ON（1）	ON（1）	ON（1）	OFF（0）	E	14
ON（1）	ON（1）	ON（1）	ON（1）	F	15

Chapter 3 Signal Connectors

3.1 The Definition of Signal Output Connectors

37core plug on the CN1 pin definition



Pin definition

Signal Name	Type	Definition
AO0~AO3	Output	Analog signal output pins, the reference ground is AGND.
AGND	GND	Analog signal ground.
DGND	GND	Digital signal ground.
DTR	Input	Digital trigger signal input, the reference ground is DGND.
NC		Not connected.

3.2 Connection Ways for Each Signal

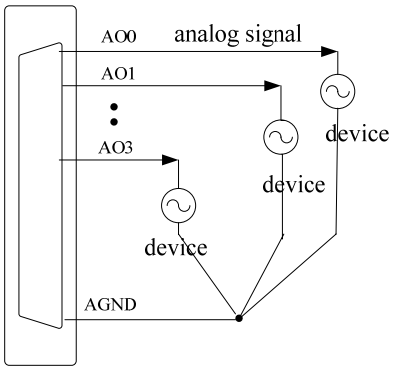


Figure 3.2.1 single-ended output connection

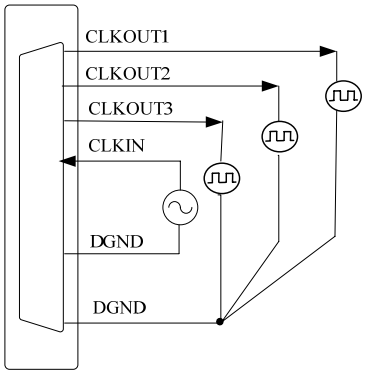
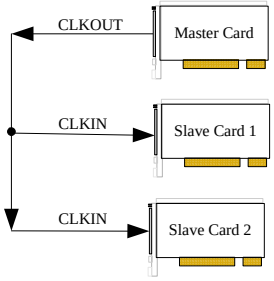


Figure 3.2.3 Synchronous trigger pulse signal input/output connectors

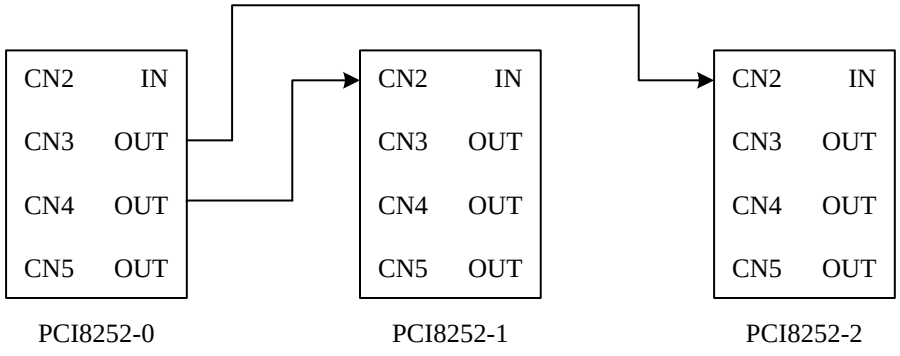
3.3 Methods of Realizing the Multi-card Synchronization

Three methods can realize the synchronization for the PCI8252, the first method is using the cascade master-slave card, the second one is using the common external trigger.

When using master-slave cascade card programs, the master card generally uses the internal clock source model, while the slave card uses the external clock source mode. After the master card and the slave card are initialized according to the corresponding clock source mode. At first, start all the slave cards, as the main card has not been activated and there is no output clock signal, so the slave card enters the wait state until the main card was activated. At this moment, the multi-card synchronization has been realized. When you need to sample more than channels of a card, you could consider using the multi-card cascaded model to expand the number of channels.



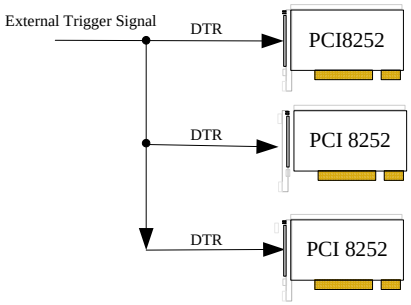
For example: the following diagram is12-channel DA simultaneous output:



PCI8252-0 is the clock source of three devices. In the software operation, first, select the PCI8252-1 and PCI8252-2

check box "2. The use of external clock", and then start the PCI8252-1 and PCI8252-2 program, as the PCI8252-0 has not yet reset, therefore, PCI8252-1 and PCI8252-2 do not have the DA trigger clock source, so the software in a wait state. Finally select the PCI8252-0 check box "allow the internal clock output" and list box "clock output", if you want to immediately clock output, need to select "Allow the clock to immediately be started", then calling the PCI8252_ResetDeviceDA to make PCI8252_0 export the internal clock, provides clock source for PCI8252-1 and PCI8252-2, at this time, three devices share the PCI8252-0's internal clock. Other two devices are activated at the same time when we start the PCI8252-0, therefore, three devices work with the same clock source, they are fully synchronized.

When using the common external trigger, please make sure all parameters of different PCI8252 are the same. At first, configure hardware parameters, and use analog or digital signal triggering (ATR or DTR), then connect the signal that will be sampled by PCI8252, input triggering signal from ART pin or DTR pin, then click "Start Sampling" button, at this time, PCI8252 does not sample any signal but waits for external trigger signal. When each module is waiting for external trigger signal, use the common external trigger signal to startup modules, at last, we can realize synchronization data acquisition in this way. See the following figure:



Chapter 4 The Instruction of the DA Trigger Function

4.1 DA Internal Trigger Mode

When DA is in the initialization, if the DA hardware parameter DAPara.TriggerMode = PCI8252_TRIGMODE_SOFT, we can achieve the internal trigger acquisition. In this function, when calling the StartDeviceProDA function, it will generate DA start pulse, DA immediately access to the conversion process and not wait for the conditions of any other external hardware. It also can be interpreted as the software trigger.

4.2 DA External Trigger Mode

When DA is in the initialization, if the DA hardware parameter DAPara.TriggerSource = PCI8252_OUT_TRIGGER, we can achieve the external trigger acquisition. In this function, when calling the StartDeviceProAD function, DA will not immediately access to the conversion process but wait for the external trigger source signals accord with the condition, then start converting the data. It also can be interpreted as the hardware trigger. Trigger source is the DTR (Digital Trigger Source).

DAPara. OutTriggerEdge= PCI8252_FALLING_EDGE, choose the trigger mode as the falling edge trigger. That is, when the CLKIN trigger signal is on the falling edge, DA will immediately access to the conversion process.

When DAPara. OutTriggerEdge= PCI8252_RISING_EDGE, choose the trigger mode as rising edge trigger. That is, when the CLKIN trigger signal is on the rising edge, DA will immediately access to the conversion process.

Chapter 5 Notes, Calibration and Warranty Policy

5.1 Notes

In our products' packing, user can find a user manual, a PCI8252 module and a quality guarantee card. Users must keep quality guarantee card carefully, if the products have some problems and need repairing, please send products together with quality guarantee card to ART, we will provide good after-sale service and solve the problem as quickly as we can.

When using PCI8252, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of PCI8252 module.

5.2 Analog Signal Output Calibration

Every device has to be calibrated before sending from the factory. It is necessary to calibrate the module again if users want to after using for a period of time or changing the output range. PCI8252 default output range: ±10V, in the manual, we introduce how to calibrate PCI8252 in ±10V, calibrations of other output ranges are similar.

1) Zero point adjustment: run ART Data Acquisition Measurement Suite in the WINDOWS. Select AO0, set the output to 0V, measuring AO0 output, adjustment potentiometer RP5 to make the actual output is 0V.
2) Full-scale adjustment: run ART Data Acquisition Measurement Suite in the WINDOWS. Select AO0, set the output to 65535, measuring AO0 output, adjustment potentiometer RP5 to make the actual output is 9999.69mV.
3) Repeat steps above until meet the requirement.

5.3 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART guarantee in the following situations:

- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).

- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.
5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.

Products Rapid Installation and Self-check

Rapid Installation

Product-driven procedure is the operating system adaptive installation mode. After inserting the disc, you can select the appropriate board type on the pop-up interface, click the button【driver installation】; or select CD-ROM drive in Resource Explorer, locate the product catalog and enter into the APP folder, and implement Setup.exe file. After the installation, pop-up CD-ROM, shut off your computer, insert the PCI card. If it is a USB product, it can be directly inserted into the device. When the system prompts that it finds a new hardware, you do not specify a drive path, the operating system can automatically look up it from the system directory, and then you can complete the installation.

Self-check

At this moment, there should be installation information of the installed device in the Device Manager (when the device does not work, you can check this item.). Open "Start -> Programs -> ART Demonstration Monitoring and Control System -> Corresponding Board -> Advanced Testing Presentation System", the program is a standard testing procedure. Based on the specification of Pin definition, connect the signal acquisition data and test whether AD is normal or not. Connect the input pins to the corresponding output pins and use the testing procedure to test whether the switch is normal or not.

Delete Wrong Installation

When you select the wrong drive, or viruses lead to driver error, you can carry out the following operations: In Resource Explorer, open CD-ROM drive, run Others-> SUPPORT-> PCI.bat procedures, and delete the hardware information that relevant to our boards, and then carry out the process of section I all over again, we can complete the new installation.